

What is claimed is:

1. Vinyl aromatic compounds having the formula $P_2C=CH-C_6X_4-nZ_n$,
wherein
 - (a) $P = H$ or D , $Z = -Y-C_6X_5$, $-Y-W-U-[(o-, m-, p-C_6X_4-CH=CH_2)]_m$, and mixtures thereof;
 - (b) independently, Y and $U = O, S, NH$, or is not present;
 - (c) W is a linking group selected from the group consisting of aromatic, polycyclic aromatic (fused-ring), 5- or 6-member heterocyclic aromatic and polycyclic-heterocyclic compounds and halogenated derivatives thereof;
 - (d) $X = F, Cl, CF_3$ and R_f , and mixtures thereof, and R_f is a C_2-C_5 hydrocarbon in which 50% or more of $C-H$ bonds are replaced by $C-F$ bonds; and
 - (e) m and n are integers in the range of 1-3.

2. The compounds according to claim 1, wherein W is a 5- and 6-member heterocyclic ring system having pendent from the heterocyclic ring at least two thiol groups, or an amino group and a thiol group, or a plurality of amino and/or thiol groups.

3. The compounds according to claim 2, wherein the heterocyclic ring is selected from the group consisting of pyridine, *s*- or *as*-thiazine, thiazoles, triazines, dithiazines, thiadiazines, pyrazine, pyrimidine, pyridazine, indolizine, imidazole, thiadiazoles, thiophene, furan, halogenated derivatives thereof, and similar compounds known in the art.

4. The compounds according to claim 2, wherein the heterocyclic aromatic ring is selected from the group consisting of 1,3,4-thiadiazole-2,5-dithiol; 5-amino-1,3,4-thiadiazole-2-thiol; trithiocyanuric acid; 4-amino-2-mercaptopyrimidine; 2,4-diamino-6-mercaptopyrimidine; 4,6-diamino-2-mercaptopyrimidone; 4,5-diamino-2,6-dimercaptopyrimidine, halogenated derivatives thereof, and similar compounds known in the art.

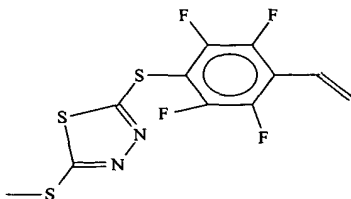
5. The compounds according to claim 1, wherein one or both of U and Y is absent, and W is a polycyclic heterocyclic ring having a $-N<$ (in ring) in place of said absent Y or U , and halogenated derivatives of said ring.

6. The compounds according to claim 5, wherein W is selected from the group consisting of 1,2-difluoro-2,3,5,6-benzenetetracarboxylic acid diimide, alloxazine {benzo[g]pteridine-2,4(1H,3H)-dione}, 2-amino-6-chloropurine, 2-amino-6-hydroxy-8-mercaptapurine, 5-aminoindazole, 5-aminoindole, 1-aminopyrine, 2-amino-6-purinethiol and similar compounds known in the art, and halogenated derivatives thereof.

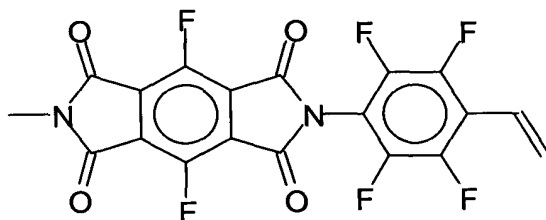
7. The compounds according to claim 1, wherein Z is selected from the group consisting of $-\text{O}-\text{C}_6\text{F}_5$, $-\text{O}-\text{C}_6\text{Cl}_5$, $-\text{S}-\text{C}_6\text{F}_5$, $-\text{S}-\text{C}_6\text{Cl}_5$, and mixtures thereof, and $n = 3$.

8. The compound according to claim 1, wherein $n = 1$ and Z is:

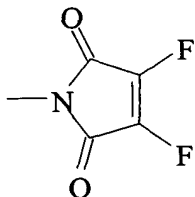
or



or



or



9. An energy polymerizable composition comprising:

(a) a first polymerizable monomer of formula $P_2C=CH-C_6X_{4-n}Z_n$,

where

(i) $P = H$ or D , $Z = -Y-C_6X_5$, $-Y-W-U-[(o-, m-, p-C_6X_4-CH=CH_2)]_m$, and mixtures thereof;

(ii) independently, Y and $U = O, S, NH$, or is not present;

(iii) W is a linking group selected from the group consisting of aromatic, polycyclic aromatic (fused-ring), 5- or 6-member heterocyclic aromatic and polycyclic-heterocyclic compounds and halogenated derivatives thereof;

(iv) $X = F, Cl, CF_3$ and R_f , and mixtures thereof, and R_f is a C_2-C_5 hydrocarbon in which 50% or more of $C-H$ bonds are replaced by $C-F$ bonds; and

(v) M and n are integers in the range of 1-3;

(b) optionally, a second polymerizable monomer or oligomer having a polymerizable vinylic group; and

(c) optionally, a polymerization initiator compound.

10. The composition according to claim 9, wherein in said first monomer W is a 5- or 6-member heterocyclic ring systems having pendent from the heterocyclic ring at least two thiol groups, or an amino group and a thiol group, or a plurality of amino and/or thiol groups.

11. The composition according to claim 10, wherein in said first monomer the heterocyclic ring is selected from the group consisting of pyridine, *s*- or *as*-thiazine, thiazoles, triazines, dithiazines, thiadiazines, pyrazine, pyrimidine, pyridazine, indolizine, imidazole, thiadiazoles, thiophene, furan, and halogenated derivatives thereof, and similar compounds known in the art.

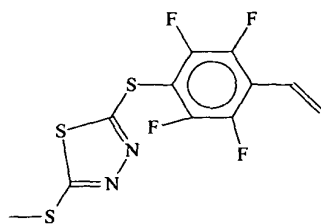
12. The composition according to claim 11, wherein in said first monomer the heterocyclic aromatic ring is selected from the group consisting of 1,3,4-thiadiazole-2,5-dithiol; 5-amino-1,3,4-thiadiazole-2-thiol; trithiocyanuric acid; 4-amino-2-mercaptopyrimidine; 2,4-diamino-6-mercaptopyrimidine; 4,6-diamino-2-mercaptopyrimidone; 4,5-diamino-2,6-dimercaptopyrimidine, and halogenated derivatives thereof, and similar compounds known in the art.

13. The composition according to claim 9, wherein one or both of U and Y is not present, and W is a polycyclic heterocyclic ring, including halogenated derivatives thereof, having an $-N<$ (in ring) moiety in place of said absent Y or U.

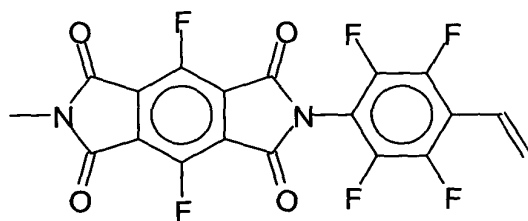
14. The compounds according to claim 13 wherein W is selected from the group consisting of 1,2-difluoro-2,3,5,6-benzenetetracarboxylic acid diimide, alloxazine {benzo[g]pteridine-2,4(1H,3H)-dione}, 2-amino-6-chloropurine, 2-amino-6-hydroxy-8-mercaptapurine, 5-aminoindazole, 5-aminoindole, 1-aminopyrine, 2-amino-6-purinethiol and similar compounds known in the art, and halogenated derivatives thereof.

15. The composition according to claim 9, wherein in said first monomer Z is selected from the group consisting of $-O-C_6F_5$, $-O-C_6Cl_5$, $-S-C_6F_5$, $-S-C_6Cl_5$, and mixtures thereof, and $n = 3$.

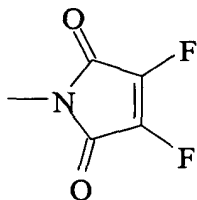
16. The composition according to claim 9, wherein in said first monomer $n = 1$ and Z is:



or



or



17. The composition according to claim 9, wherein said second monomer is selected from the group consisting of styrene compounds, vinyl sulfides, acrylates, methacrylates, olefins, acetylene compounds, thiols and polythiols and similar compound having carbon-carbon multiple bonds, and mixtures of the foregoing, and halogenated derivatives of any of the foregoing.

18. The composition according to claim 17, wherein said second monomer is an acrylate, a methacrylate, or mixtures of one or more thereof, including halogenated derivatives thereof.

19. The composition according to claim 17, wherein said second monomer is a fluorinated acrylate or methacrylate of general formula $\text{CH}_2=\text{CA}-\text{C}(\text{O})-\text{O}-\text{R}_f$, or a mixture of one or more thereof, where $\text{A} = \text{H}, \text{CH}_3, \text{CF}_3$ and R_{f2} , and R_{f2} is a highly fluorinated $\text{C}_1\text{-C}_{10}$ alkyl group.

20. The composition according to claim 9, wherein said composition includes said optional initiator, and said initiator is a thermal initiator or free radical initiator.